

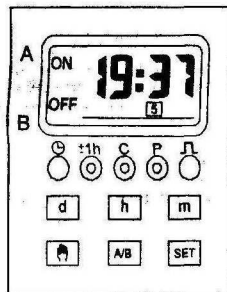
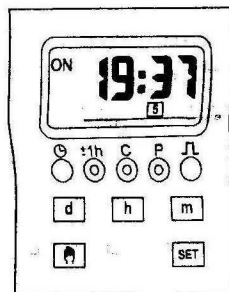
OPERATING INSTRUCTIONS

Digital weekly time switch

1 Explanation of display and control buttons

One-channel timer

Two-channel timer



1.1 Control buttons

- Set time and day of the week
- Manual switching summer/winter time
- Reset button
- Programme button
 - a) Recall button for timer function
 - b) Input button for pulse switching points
- Set day button
- Set hour button
- Set minutes button
- Manual override button
- Channel selection button (Two-channel timer only)
- Set/Change switching level button

Pressing and holding or buttons will cause the setting to be advanced rapidly.

1.2 Day Identification (single day or block of days)

- to = Days of the week, corresponds to Monday
- — = switching ensues Mon to Fri
- — — — — = switching ensues Sat and Sun
- — — — = switching ensues Mon to Thu
- = switching ensues Mon to Sat
- = switching ensues every day

2 Initial operation

2.1 Safety warning

N.B.! Electrical equipment may only be installed and fitted by a qualified person.
The time switch may not be used for switching protective extra-low voltages under DIN 57 100, Part 410 / VDE 0100, Part 410, Section 4.1. Connection according to connection diagram (observe VDE 0100).

2.2 Time switch fitted with back-up lithium battery (special model)

In this variation of the time switch the time day and date are pre-set to include summer time and winter time adjustment. All switching points and program values can be entered without mains supply voltage but are only saved once mains voltage is connected. If button is activated beforehand, they are lost.

The display is activated

If no button is activated within 30 min, the display goes off.

2.3 Initial operation

Approximately 1 minute after the supply is connected to the timer press the button and the display appears 75 seconds later.

Do not use sharp or pointed objects as this can cause damage to the time switch. Use a ball-point pen, for example.

3 Basic functions

3.1 Setting time and day

Press to enter the set mode. The colon stops flashing.

- Set day
- Set hours
- Set minutes
- Save settings.

3.2 Setting date and automatic summer/winter time adjustment

The date must be entered in order to use automatic summer/winter time adjustment and the astronomical functions.

The time is displayed and the colon flashes:

Press for 5 seconds: 1. 1 appears in the display.

- Enter day (default setting is 1)
- Set month (default setting is 1)
- Switch to year setting (default setting is "01")
- Set year "01 = 2001"
- Saves the settings with automatic summer/winter time adjustment

Saves the settings without automatic summer/winter time adjustment.

When the settings are saved by pressing , 1h appears in the display. Automatic summer/winter time adjustment is then activated.

3.3 Deactivating automatic summer/winter time adjustment

Press for 5 seconds, then press .

The symbol appears in the display. Automatic summer/winter time adjustment is deactivated.

3.4 Manual summer/winter time adjustment

Press the button until the correct time is displayed.

If the symbol appears in the display, the summer/winter time setting cannot be changed manually.

3.5 Setting switching point commands

When is pressed, the first switching point ON appears in the display.

- Set day/day block (see 1.2)
- Set hours
- Set minutes

If is pressed again, OFF appears in the display for the next switching point to be entered.

- Set day/day block (see 1.2)
- Set hours
- Set minutes

The switching points are set automatically without additional saving.

By pressing the button again enables the next switching point to be programmed.

The current time is displayed again after 60 seconds or by pressing the button.

Two-channel timer: press , then to select channel B, and continue as described above.

3.6 Changing switching points commands

Press repeatedly until the desired switching point appears in the display.

To set the new times, proceed as described in 3.5.

The current time is displayed again after 60 seconds or by pressing the button.

3.7 Deleting switching points commands

Press repeatedly until the desired switching point appears in the display.

Press repeatedly until ---:--- appears in the display.

The switching point is deleted and the next switching point is displayed.

The current time is displayed again after 60 seconds or by pressing the button.

Two-channel timer: press , then to select channel B, and continue as described above.

The current time is displayed again after 60 seconds or by pressing the button.

3.8 Manual and permanent switching

Repeated pressing of displays the following operating modes: Automatic off (OFF), Automatic on (ON), Permanent off (OFF FIX), Permanent on (ON FIX).

Two-channel timer: Press the button to select the desired switching channel A or B, then continue as described above.

With the settings permanently on (ON FIX) or permanently off (OFF FIX) the stored programme will be bypassed without the loss of the programme values.

The current time is displayed again after 60 seconds or by pressing the button.

4 Special functions

4.1 Deactivate individual switching points

Recall the switching point by pressing and deactivate it by pressing the button. is displayed above the colon. This switching point remains inactive until it is reactivated.

Activating the switching point: recall the switching point by pressing , then press : appears in the display above the colon.

Two-channel timer: press , then to select channel B, and continue as described above.

The current time is displayed again after 60 seconds or by pressing the button.

4.2 Holiday switching

This function enables the switching channels to be set permanently **On** or **Off** for a maximum period up to 99 days without the programming of the switching points having to be changed.

Holiday switching is not possible in ON FIX or OFF FIX (permanent switching) switching modes. This is indicated by the symbol flashing in the display.

Press the button for 5 seconds until 0 d appears in the display. Press repeatedly until the desired number of days appears in the display.

Select the desired switching mode OFF or ON.

Do not press any other button after this, otherwise the holiday switching mode will be deactivated again.

Two-channel timer: press the button for 5 seconds until 0 d appears in the display.

Select channel B.

Then proceed as described above.

Once the set holiday period has expired, the time switch resets automatically to the normal display. If different holiday periods have been entered in the Two-channel timer, switching back to the normal display occurs on expiry of the longer period.

4.3 Random switching points

Switching points do not have to be switched at the programmed time. They can also be switched randomly within a set time window. This timeframe can be between +/- 1 – 59 min (see Table 1).

When is pressed while programming a switching point (see 3.5), when the symbol appears in the display.

4.4 Reset button

Pressing the button deletes the time, day and date.

Pressing the and buttons deletes the time, day, date and switching points, with subsequent resetting to the default settings (see also 2.3).

4.5 Program button

Pressing initiates the program mode.

	Function	Display/ settings	Default setting
	Pulse function	P1, P2, P3	P1
1x	Astronomical function	A0, A1, A2, A3, A4, A5	A0
2x	Latitude	S 90 to n 90	n 50
3x	Longitude	E 180 to u 180	E10
4x	Time zone	t -11 to t 12	+1 for CET
5x	Sun below horizon	0° to 18°	6°
6x	Morning time differential	-2:59 to 2:59 [1]	0:00 h
7x	Evening time differential	-2:59 to 2:59 [2]	0:00 h
8x	Fluctuation range of random switching points	1 to 59 [3]	30 min
9x	Cycle error correction	-99 to 99 [4]	differs

Table 1

Setting is carried out by pressing the and buttons.

Confirm the new set value by pressing the button.

Leaves the program mode without saving the function just displayed.

5 Pulse function

5.1 Pulse function P1

One pulse duration can be set per channel (A or B). A pulse is executed via a pulse switching point.

A pulse can also be activated manually (timer function). The switching point is activated with a pulse of 1 sec (default setting). Depending on the switching mode ON or OFF, an OFF or ON pulse switching point is executed.

To set pulse switching points

If pulse switching points are to be executed, the button has to be pressed additionally when entering the switching point (see 3.5).

Two-channel timer: press , then to select channel B. Then proceed as described above.

The current time is displayed again after 60 seconds or by pressing the button.

Setting pulse lengths

A pulse length of 00:01 min to 59:59 min duration can be entered per channel (A or B).

Pressing and displays the current value.

Enter minutes
 Enter seconds

Save by pressing .

Two-channel timer: Press the button, then select channel B by pressing the and buttons. Then continue as described above to enter the pulse length. Press to save the settings.

The pulse length set is valid for all pulse switching points (P1).

Timer function

The timer function is used to switch from the OFF to the ON position or vice versa.

The timer function cannot be used in the ON FIX and OFF FIX modes (permanent switching).

The timer function is initiated by pressing the .

Two-channel timer:

Press to select the channel, then press the .

Cancel timer function


One-channel timer: press the button.

Two-channel timer: Press to select the channel, then press the button.

If an ON pulse is cancelled, the time switch sets itself to the OFF Automatic / position (according to the program) or vice versa.



5.2 Pulse function P2 (description)



Using pulse function P2, each pulse switching point can be assigned its own pulse duration. On entry, a pulse switching point is always followed by the associated pulse duration.
A pulse duration of between 00:00 min and 59:59 min can be entered.



 There is no timer function available in the P2 pulse function mode.



Setting pulse function P2: see Table 1.

Setting pulse switching points with pulse duration

In addition to entering a switching point (see 3.5), the  button is activated, thus marking the pulse switching point. The pulse symbol $\rightarrow \updownarrow \leftarrow$ appears in the display. On pressing the  button again, 00:00 appears in the display. The pulse duration is identified by the symbol $\rightarrow \updownarrow \leftarrow$.

 Enter minutes
 Enter seconds

 Pulse switching points (with set pulse duration) and normal switching points can be entered in any sequence. To do this, press the  button again.

If a normal switching point already entered is subsequently identified as a pulse switching point through marking with the  button, the following switching points then move down, and a pulse duration is inserted. This appears in the display when next pressing the  button. If all memory locations are occupied, subsequent conversion into a pulse switching point will be rejected.



5.3 Pulse function P3 (only on the Two-channel timer)

A pulse sequence can be programmed for channel B which can be started or stopped manually or via channel A.



Setting pulse function P3 - see Table 1.


Setting the pulse sequence:

Only switch-on or switch-off pulses of 00:00 min to 59:59 min can be entered for channel B. The entry of normal switching points is restricted.


Setting a pulse sequence for channel B is initiated by pressing the  and  buttons.

The symbol $\rightarrow \updownarrow \leftarrow$ in the display indicates that the entry of a pulse duration is expected.

 Set minutes
 Set seconds



After entering the switch-on pulse duration, the entry of a switch-off duration is expected after pressing the  button again. A sequence of alternating switch-on and switch-off durations forms a pulse sequence.

Starting and stopping a pulse sequence manually

A pulse sequence entered for channel B is started by pressing the  button.


$\rightarrow \updownarrow \leftarrow$	ON	00:15 min	The entries form, for example, a pulse sequence which, after starting, activates channel B for 00:15 min, deactivates it for 00:15 min, activates it for 00:01 min, deactivates it for 00:04 min, etc.
$\rightarrow \updownarrow \leftarrow$	OFF	00:15 min	
$\rightarrow \updownarrow \leftarrow$	ON	00:01 min	
$\rightarrow \updownarrow \leftarrow$	OFF	00:04 min	
$\rightarrow \updownarrow \leftarrow$	ON	00:01 min	
$\rightarrow \updownarrow \leftarrow$	OFF	00:04 min	

Table 2

The pulse sequence is repeated ad infinitum until stopped by pressing the  button again. Channel B remains in the switching mode just adopted. On pressing the  button again, the pulse sequence recommences from the beginning.

Starting and stopping a pulse sequence via channel A


Normal switching points and pulse switching points can be entered for channel A.

The pulse switching points are entered in the same way as the switching points, with additional pressing of the  button marking the pulse switching point.





It is not possible to enter pulse durations for channel A.

A switch-on point activates channel A, while a switch-off point deactivates channel A.

In contrast, a pulse switch-on point starts the pulse sequence on channel B, while a pulse switch-off point stops the pulse sequence on channel B.

An impulse sequence started via a pulse switch-on point can be stopped by manually pressing the  button. Conversely, a pulse sequence started manually can be stopped by a pulse switch-off point. The pulse sequence always starts from the beginning.


Deleting switch-on and switch-off pulses

Press , then the  button. Then press  repeatedly until $--:--$ appears in the display. Pressing  again enables the next pulse duration to be deleted in the same way.

6 Astronomical switching functions

For the astronomical switching functions, the clock calculates the morning and evening twilight times. The twilight times can, like the entered switching points, be used to execute switching functions. At dusk, for example, a light can be switched on and switched off again at dawn. The shifting of the twilight times over the year is taken into account in this function.

Further ways of linking the twilight times with entered switching points can be specified by selecting the "Astronomical functions" (A 1 to A 5).

 On Two-channel timers the astronomical switching functions can only be executed with channel A.


6.1 Selecting the astronomical function

The time switch provides 5 astronomical functions.

For setting: see Table 1, point 4.5

Longitude and latitude: the twilight times depend on the geographical position of the place of operation. The default setting is 50° north (latitude) and 10° east (longitude), corresponding roughly to the geographical position of Frankfurt/Main, Germany.


Clock zone: The standard clock zone is set for Central Europe. The value must be changed corresponding to the place of operation.

 Other cities are listed in the enclosed leaflet together with their longitudes/latitudes and clock zones. For the setting of other values, see Table 1.


Sun below horizon: the time switch calculates the current twilight times based on the angles entered. The default setting is an angle of 6°, corresponding to the "civil twilight" (12° = nautical twilight, 18° = astronomical twilight).


For setting other values, see Table 1.


Morning and evening time differential: the time differentials enable the twilight switching points to be shifted and determine the morning and evening switch-on duration (see Table 1). The setting 0:00 makes the time differentials ineffective. Only effective for the functions A1 and A2.

Twilight switching points: when an astronomical function has been selected, the clock calculates the current twilight times. These are recalculated at 0:00 h on each subsequent day. The twilight times are stored as special switching points and can be displayed by pressing the  button:

The time is displayed, the colon flashes.

 The dawn switching point is displayed.


Pressing  again displays the dusk switching point.

 The date must be entered when using the automatic summer/winter time switchover and astronomical functions. If the astronomical function is deactivated (= A0), no twilight switching points are displayed.

6.2 Astronomical function A1

In astronomical function A1, the dusk switching point acts as a switch-on point and the dawn switching point as a switch-off point.


Function A1 also provides the possibility to shift the calculated twilight switching points. One time differential each can be set for both the dawn and the dusk switching points, enabling execution of the twilight switching points to be advanced or retarded. In the case of a negative differential value, the switching point is activated correspondingly earlier, with a positive value correspondingly later. To change the programmed default settings, see Table 1.

 Activating astronomical function A1 makes additionally set switching points ineffective. This applies to the One-channel timer as well as channel A of the Two-channel timer.

6.3 Astronomical function A2

Function A2 enables the switching on of a consumer item after dusk or before dawn for a desired period of time. The period during which the consumer item (e.g. a light) is switched on after dusk is determined by the evening time differential. The morning time differential determines the duration of switch-on time before dawn (see Table 1).

If one of the switching sequences is not to be executed in the evening or morning, the corresponding time differential must be set at 0:00.

 Activating astronomical function A2 makes additionally set switching points ineffective. This applies to the **One-channel timer** as well as channel A of the **Two-channel timer**.

6.4 Astronomical function A3 (AND-linked)

Function A3 links the switching points entered for channel A with the twilight times. Only switching function set to operate which in twilight time and are linked with two additional ON-OFF-switching points.

ON-switching point switches ON

OFF-switching point switches OFF

Example 1		
Switching point	15:00 ON	22:00 OFF
Dusk/dawn	20:00	7:00
Consumer ON	20:00 to 22:00	

Table 3

In example 1, the time switch switches the consumer item ON at 20:00 and OFF again at 22:00. If dusk begins after 22:00, the switching point is ignored, and the consumer item is not switched on.

Example 2		
Switching point	5:00 ON	22:00 OFF
Dusk/dawn	20:00	7:00
Consumer ON	20:00 to 22:00	5:00 to 7:00

Table 4

In example 2, the time switch switches the consumer item ON at 20:00 and off at 22:00 the next morning ON at 5:00 and OFF at 7:00. If dusk begins after 22:00, and dawn before 5:00, the programmed switching points are ignored.

6.5 Astronomical function A4 (OR-linked)

Function A4 facilitates another way of linking the twilight times with the switching points entered for channel A. Switch-on phases stipulated via switch-on and switch-off points and the switch-on phase between dusk and dawn have equal status. The consequence of this for channel A is that the switch-on phases overlap.

Example 1	On	Off	Example 2	On	Off
Switching points/Programmed	21.00	7.00	Switching points/Programmed	21.00	7.00
Dusk/dawn/summer	22.00	6.00	Dusk/dawn/winter	18.00	8.00
Executed switching time	21.00	7.00	Executed switching time	18.00	8.00

Table 5


In example 1, the time switch goes by the programmed switching points and in Example 2, by the twilight times.

6.6 Astronomical function A5


Function A5 enables channel A to be switched on and off via two separate paths. The channel is always switched on via the dusk switching point and switched off with the next switching point on the following day, not by the dawn.

Example 1	On/Off	On/Off	Example 2	On/Off	On/Off
Switching points/Programmed	–	–	Switching points/Programmed	–	–
Dusk/dawn/summer	22.00 (6.00)	22.00 (6.00)	Dusk/dawn/winter	18.00 (8.00)	18.00 (8.00)
Executed switching time	22.00/7.00	22.00/9.00	Executed switching time	18.00/7.00	18.00/9.00

Table 6

 N.B.: Further additionally entered switching points are not executed in channel A.

7 Setting cycle error correction

 Cycle error correction can only be set when mains voltage is connected.

Cycle correction value: the cycle precision of the time switches at room temperature (20°C) is generally better than 1 second per day. Higher ambient temperatures, however, can cause an additional cycle error. If the ambient conditions are constant to the greatest possible extent, the error can be minimised by resetting the cycle correction value. To do this, the cycle error is determined by comparing it with a time signal (e.g. radio or television) over a period of exactly one week. The value in seconds of cycle deviation per week obtained in this manner is then taken into account when resetting the cycle correction value. If the time switch is fast, the cycle correction value is reduced by the number of seconds. If the time switch is slow, the value is increased by the number of seconds.

The factory default setting for cycle error correction is for conditions of approx. 20°C. The newly ascertained cycle deviation must be added to or subtracted from the default value.

Example:

Default value for cycle correction: +2 sec per week
Newly ascertained cycle deviation: +3 sec per week.

3 seconds must be deducted from the default setting, i.e. –1 must appear in the display (for setting, see Table 1).

8 Technical details

8.1 Updating the switching outputs

If new switching points are entered or the current time is changed, the current switching status is re-calculated in each case, and the entered switching points are updated accordingly within 1 minute.

8.2 Behaviour in the case of electrical supply failure

In the event of losing the supply voltage, the switching relay(s) is/are deactivated (OFF position), and the digital display is switched off.

Approximately 1 minute after supply voltage is restored, the relays commence working again as programmed.

Should the cycle reserve be exhausted after a longer period of supply failure, the switching points will be retained indefinitely. Only the time, day and date have to be re-entered after a certain period (see 8.3, Cycle reserve).

8.3 Technical data

Electrical connection	see rating plate
Internal power consumption	1 W
Switching output	see rating plate
Switching contact	1 (2) alternator(s), floating
Number of switching points	56 (One-channel timer); arbitrary assignment for Two-channel timer
Shortest switching interval	1 min. (for pulse programming: 1 sec)
Cycle accuracy	≤ ± 1 sec/day; 20°C
Reserve power supply (charging time > 1h)	≥ 38 hours at 20°C (Supercap) 5 years (lithium battery)
Temperature limits	–10°C to +50°C
Protection category	II acc. to EN 60335 installed
Protection type	IP 20 acc. to EN 60529 installed

9 Disposal

Depending on the model type a battery is included within the time switch. Batteries must not be put into domestic waste. The consumer is obliged to return used batteries. To help preserve the environment, the time switch should be disposed via an approved recycling facility.

